WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

During the closing days of June a period of warm, dry weather over the eastern half of the United States began to give way to an area of showers and cooler weather that extended over the Atlantic States during the opening days of July. Temperature continued low generally east of the Mississippi River during the first decade of July and on the 4th and 5th minimum readings as low or lower than previously recorded for the time of year were reported in the Lake region and Middle Atlantic and New England States.

Rains that set in over the Rocky Mountain districts on the 3d and 4th and extended thence eastward inaugurated a seven-day period of heavy rains in the lower Missouri and middle and upper Mississippi valleys that carried rivers and streams above the flood stage. The rainy season in the Southwest also began about this time, heavy rains being reported in Arizona, New Mexico, and western Texas.

From the 10th to 12th severe local storms occurred in the upper Mississippi and Ohio valleys and during the 13th and 14th the rain area overspread the Atlantic States. Following the rain over the eastern districts there were several days of comparatively cool weather. In a special forecast issued July 16 the following statement was made:

A disturbance will advance from the Rocky Mountains to the Atlantic coast from about the 20th to 23d, preceded by a warm wave and attended by copious rains from the Mississippi Valley to the Atlantic coast.

The disturbance referred to appeared on the eastern slope of the Rocky Mountains on the 20th and reached the Atlantic coast on the 23d. Preceding the depression temperatures were high over the interior and the rains that attended its advance were excessive in areas from the Mississippi Valley to the Atlantic.

Atlantic pressures were high throughout the month in the region of the Azores and except on the 6th and during the third decade of the month continued high over the British Isles. This distribution of pressure over the Atlantic Ocean during the warmer months increases barometric gradients to the southward and southwestward, strengthens the northeast trade winds, and apparently thus promotes the development of cyclonic disturbances in the tropical and subtropical regions of the southwestern Atlantic. Under these conditions a tropical storm appeared over the Caribbean Sea during the second decade of the month and moved thence northwestward to the Texas coast by the 21st.

The presence of this disturbance over the Caribbean Sea to the southeast and then to the south of Jamaica was faintly indicated on the 15th and 16th. From the 17th to 19th the center of disturbance moved northward over the Yucatan Channel into the Gulf of Mexico where it recurved to the northwest with increasing intensity during the 20th and reached the Texas coast south of Galveston on the 21st.

Beginning the 17th advices regarding the storm were telegraphed to Habana and southern Florida ports and from the 18th to 21st Atlantic coast and Gulf shipping interests were informed daily regarding the presence in the Gulf and the apparent position and course of the storm which until the 21st was far out in the Gulf.

The following report of the official in charge of the local office of the Weather Bureau at Galveston, Tex., is supplemented by a more detailed report under District No. 8, page 352:

Not a life was lost within the area protected by the sea wall and the damage to property was nominal. Outside of the sea wall everything exposed to the wind and waves was destroyed or injured. Among the complete losses were two bathing pavilions, two fishing piers, several structures near the beach beyond the western end of the sea wall, and two fishing piers on the jetties several miles east of Galveston. One other bathing pavilion was badly damaged. The railroad bridge over the bay was damaged and traffic and telegraphic and telephonic communication interrupted. The total damage was estimated at about $100,000 and was possibly greater. Eleven persons went down with one of the piers on the jetties, seven of whom were picked up alive on the following day. There was no damage to shipping except that a few small boats were lost.

The first announcement of the storm's approach was received at this office at 12:57 p. m., July 18. This was followed by further advisory messages on the 19th and 20th, the message of the 20th being to the effect that the disturbance was apparently over the central Gulf moving northward. Shipping interests and the public were kept thoroughly informed by telephone, bulletins, and the press, and I believe that on July 20 there was not a single news-reading person in the city who was not aware of the storm.

It is estimated that the Gulf rose nearly 10 feet above the normal. The entire western portion of Galveston Island was under water and a large number of cattle and hogs was drowned. Volumes of water dashed over the sea wall and flooded lower portions of the city.

The following is from an Associated Press report that was sent out from Houston, Tex., the night of July 23:

Advices show that damage was done throughout a section of Texas extending on an average 100 miles into the interior. In some counties some reports indicate that very few home owners escaped losses of at least a minor sort. While the property destruction has been great the life loss and serious injury is almost inexplicably small. This is attributed largely to the fact that storm warnings gave the inhabitants an opportunity to prepare for the expected blow.

The following special from Houston appeared in the New Orleans Times-Democrat of July 22:

Official bulletins issued by the United States Weather Bureau gave warning of the approaching storm and in some measure shipping was prepared for it, had it not been of such a violent nature.

The Daily Picayune of July 22, contained the following special dated the 21st from Galveston:

A hurricane for east Texas was forecast by the Weather Bureau early this morning and warnings were sent out. When the wind and rain in all their intensity arrived several hours later they found Galveston prepared. The inhabitants of the few scattered houses in the low section of the island had already sought safety and vessels that had cleared and were prepared to sail were riding at anchor in the bay.

The Washington, D. C., Post of July 29, comments editorially on the storm as follows:

The citizens of Galveston and the residents of the Texas coastal plain owe a great debt of gratitude to the United States Weather Bureau for the timely warnings of the tropical storm which recently swept in from the Gulf of Mexico. While the loss was large from the ravages of the hurricane, yet it probably would have reached an appalling total in death and damage to property had not the storm's destructive path been foreseen by the Bureau many hours before it struck the coast.

Passing inland from the coast the storm diminished rapidly in intensity. Heavy rains, however, attended its progress over southern Texas as far as the Pecos River.

During the passage of the storm over the Gulf of Mexico exceptionally heavy rains in portions of the upper Lake region attended the passage over the Northen States of a depression of slight intensity. At Duluth, Minn., more than 8 inches of rain fell from the 19th and 22d, inclusive.

The following special forecast was issued Saturday, July 24:

Several days of fair weather and moderate temperature are indicated for the eastern portion of the United States. Temperature will rise in the central valleys from Sunday until about the middle of the week and in the Atlantic States from Tuesday until about the close of the week. The next general rain area will cross the country east of the Rocky Mountains during the latter half of next week and will reach the Atlantic States Friday or Saturday.

Following several days of comparatively fair and pleasant weather over the eastern districts temperature rose as indicated and at points in the Middle-Eastern States the readings were the highest noted for the present year. At Washington, D. C., a maximum of 96° was recorded on the 29th and 94° on the 30th. The eastward movement of the warm wave was followed by an area of rain and cooler weather that reached the Atlantic States Friday and Saturday, the 30th and 31st.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	67.3	− 1.5	+ 3.6	+ 0.5
Middle Atlantic	16	72.8	− 1.8	+10.1	+ 1.4
South Atlantic	10	77.4	− 1.6	+10.9	+ 1.6
Florida Peninsula*	8	81.1	− 0.1	+15.3	+ 2.2
East Gulf	11	80.5	+ 0.3	+ 7.5	+ 1.1
West Gulf	10	84.0	+ 2.2	+10.7	+ 1.5
Ohio Valley and Tennessee	13	74.3	− 2.5	+ 5.4	+ 0.8
Lower Lakes	10	69.2	− 2.3	+ 1.9	+ 0.3
Upper Lakes	12	67.4	− 0.4	+ 4.4	+ 0.6
North Dakota*	9	67.4	− 0.5	− 3.9	− 0.6
Upper Mississippi Valley	14	73.0	− 2.4	+ 0.2	0.0
Missouri Valley	12	75.1	− 0.6	+ 2.4	+ 0.3
Northern slope	9	68.0	− 0.1	− 4.7	− 0.7
Middle slope	6	78.2	+ 1.6	+ 3.4	+ 0.5
Southern slope*	8	82.8	+ 2.4	+10.0	+ 1.4
Southern Plateau*	11	78.9	− 0.3	− 4.5	− 0.6
Middle Plateau*	11	70.6	0.0	+ 2.6	+ 0.4
Northern Plateau*	12	66.0	− 2.5	− 3.9	− 0.6
North Pacific	7	59.1	− 2.1	− 8.8	− 1.3
Middle Pacific	5	65.7	− 1.1	− 1.2	− 1.5
South Pacific	4	68.6	− 1.3	− 1.5	− 0.2

*Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	11	1.88	53	− 1.70	+ 0.40
Middle Atlantic	16	1.94	44	− 2.50	+ 2.30
South Atlantic	11	4.92	80	− 1.20	− 3.20
Florida Peninsula*	8	8.06	121	+ 1.40	+ 0.50
East Gulf	11	4.49	85	− 0.80	+ 7.00
West Gulf	10	1.39	42	− 1.90	− 8.40
Ohio Valley and Tennessee	13	4.62	112	+ 0.50	+ 4.20
Lower Lakes	10	3.72	109	+ 0.30	+ 3.60
Upper Lakes	12	3.55	113	+ 0.40	+ 1.00
North Dakota*	9	3.00	111	+ 0.30	− 0.10
Upper Mississippi Valley	15	3.73	103	+ 0.10	+ 2.40
Missouri Valley	12	5.06	134	+ 1.20	+ 2.60
Northern slope	9	2.41	150	+ 0.80	+ 1.30
Middle slope	6	3.46	117	+ 0.50	− 1.20
Southern slope*	8	2.01	69	− 0.90	− 5.30
Southern Plateau*	10	1.31	93	− 0.10	− 1.50
Middle Plateau*	11	0.76	136	+ 0.20	− 0.40
Northern Plateau*	12	1.49	253	+ 0.90	+ 0.10
North Pacific	7	1.28	164	+ 0.50	− 2.00
Middle Pacific	7	0.07	100	0.00	+ 6.70
South Pacific	4	T.	100	0.00	+ 5.20

*Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	73	− 4	Missouri Valley	70	+ 1
Middle Atlantic	67	− 7	Northern slope	61	0
South Atlantic	71	− 6	Middle slope	64	+ 2
Florida Peninsula	82	+ 3	Southern slope	61	− 1
East Gulf	79	+ 4	Southern Plateau	45	+ 6
West Gulf	71	− 3	Middle Plateau	37	−13
Ohio Valley and Tennessee	72	0	Northern Plateau	47	−15
Lower Lakes	68	− 6	North Pacific	76	+ 1
Upper Lakes	70	− 7	Middle Pacific	59	−13
North Dakota	76	+ 4	South Pacific	65	− 3
Upper Mississippi Valley	72	0			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	4.9	− 0.6	Missouri Valley	4.2	− 0.6
Middle Atlantic	4.3	− 0.9	Northern slope	3.5	− 1.3
South Atlantic	5.2	+ 0.4	Middle slope	3.8	− 0.3
Florida Peninsula	5.8	+ 1.2	Southern slope	4.2	− 0.2
East Gulf	5.8	+ 0.8	Southern Plateau	2.8	− 0.2
West Gulf	3.3	− 1.4	Middle Plateau	2.4	− 1.6
Ohio Valley and Tennessee	5.1	− 0.2	Northern Plateau	3.2	− 1.8
Lower Lakes	4.6	− 1.4	North Pacific	5.4	− 0.9
Upper Lakes	4.6	− 1.2	Middle Pacific	2.6	− 1.8
North Dakota	4.4	− 0.6	South Pacific	2.4	− 1.4
Upper Mississippi Valley	4.9	− 0.1			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Bismarck, N. Dak.	27	50	nw.	Pt. Reyes Light, Cal.	2	62	nw.
Cleveland, Ohio	3	52	nw.	Do.	3	64	nw.
Do.	12	57	w.	Do.	4	58	nw.
Columbia, Mo.	12	54	n.	Do.	5	56	nw.
Columbus, Ohio	12	64	w.	Do.	6	54	nw.
Detroit, Mich.	2	60	sw.	Do.	8	50	nw.
El Paso, Tex.	13	67	nw.	Do.	9	68	nw.
Do.	15	54	ne.	Do.	10	70	nw.
Galveston, Tex.	21	68	e	Do.	11	54	nw.
Huron, S. Dak.	30	69	nw.	Do.	15	64	nw.
Jacksonville, Fla.	18	55	sw.	Do.	16	62	nw.
Kansas City, Mo.	12	52	n.	Do.	17	66	nw.
Milwaukee, Wis.	2	58	nw.	Do.	24	60	nw.
Mt. Tamalpais, Cal.	2	50	nw.	Do.	25	77	nw.
Do.	3	54	nw.	Do.	26	73	nw.
Do.	4	56	nw.	Salt Lake City, Utah	18	50	e.
Do.	9	70	nw.	Sand Key, Fla.	17	52	se.
Do.	10	72	nw.	Do.	18	52	se.
Do.	11	62	nw.	Sheridan, Wyo.	20	52	nw.
Do.	15	62	nw.	Southeast Farallon Cal.	17	53	nw.
Do.	16	62	nw.	Toledo, Ohio	2	56	s.
Do.	17	52	nw.	Do.	15	54	nw.
Do.	25	64	nw.	Wichita, Kans.	11	56	nw.
Do.	26	66	nw.	Do.	14	55	nw.
North Head, Wash.	10	56	se.				

RAINFALL IN JAMAICA.

Through the kindness of Mr. Maxwell Hall, meteorologist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following data:

Comparative table of rainfall.

[Based upon the average stations only.]

JULY, 1909.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1909.	Average.
			Inches.	*Inches.*
Northeastern division	25	17	4.78	6.33
Northern division	22	41	3.40	3.10
West-central division	26	20	8.44	8.01
Southern division	27	26	5.45	4.57
Means	100	.....	5.52	5.50

The rainfall for the island for the month of July was therefore the average. The heaviest rainfall, 17.12 inches, was recorded at Petersville, and the least was 1.25 inches, at Halfway Tree.